

Alexander Moiseev. Talk at the Colloquium in Physics Department of UMBC, October 6, 2010

Title: New results on high energy cosmic ray electrons observed with Fermi LAT and their implications of the origin of cosmic rays

Abstract: The Large Area Telescope on-board the Fermi Gamma-Ray Space Telescope has collected more than 10 million cosmic ray electrons with energy above 7 GeV since its science operation on orbit. High energy electrons rapidly lose their energy by synchrotron radiation on Galactic magnetic fields and by inverse Compton scattering on the interstellar radiation field. The typical distance over which a 1 TeV electron loses half its total energy is estimated to be 300-400 pc. This makes them a unique tool for probing nearby Galactic space. Observed spectrum has a harder spectral index than was previously reported and suggests the presence of nearby sources of high energy electrons. One of viable candidates are nearby pulsars, possibly some of recently discovered by Fermi. At the same time the dark matter origin of such sources cannot be ruled out. I will also report our current upper limits on cosmic ray electrons anisotropy which helps to set constraints on their local sources.